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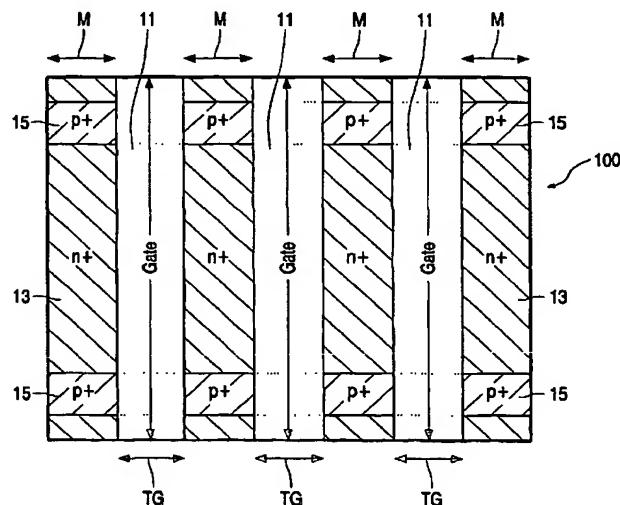
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(54) Title: TRENCH-GATE SEMICONDUCTOR DEVICES**WO 03/088364 A2**

(57) Abstract: A trench-gate vertical power transistor in which the trench-gates (11) are parallel stripes which extend across the active area (100). Source regions (13) and ruggedness regions (15) extend to a source contact surface as alternating stripe areas having a width perpendicular to and fully between each two adjacent parallel stripe trench-gates (11). The ruggedness regions (15) are more heavily doped than the source regions and this enables an increased length of the source regions with a consequent reduction in specific resistance of the transistor. For example, the mesa width (13,15) and the trench-gate (11) width may both be about 0.4μm, the ruggedness region (15) length may be about 1μm and the source region (13) length may be about 20μm. The doping concentration of the p type ruggedness regions (15) may be approximately 10 times greater than the doping concentration of the n type regions(13), for example about 10<sub>21</sub> cm.<sup>-3</sup> and about 10<sub>20</sub> cm.<sup>-3</sup> respectively.



*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*